

**NORTH CAROLINA DIVISION OF  
AIR QUALITY**

**Application Review**

**Issue Date:** TBD

**Region:** Mooresville Regional Office  
**County:** Cabarrus  
**NC Facility ID:** 1300155  
**Inspector's Name:** Bob Caudle  
**Date of Last Inspection:** 10/29/2018  
**Compliance Code:** 3 / Compliance - inspection

<b>Facility Data</b>  <b>Applicant (Facility's Name):</b> Piedmont Natural Gas - Concord Compressor Station  <b>Facility Address:</b> Piedmont Natural Gas - Concord Compressor Station 2560 Derita Road Concord, NC 28027  <b>SIC:</b> 4923 / Gas Transmission And Distribution <b>NAICS:</b> 22121 / Natural Gas Distribution  <b>Facility Classification: Before:</b> Title V <b>After:</b> Title V <b>Fee Classification: Before:</b> Title V <b>After:</b> Title V			<b>Permit Applicability (this application only)</b>  <b>SIP:</b> 15A NCAC 02Q .0317 <b>NSPS:</b> n/a <b>NESHAP:</b> n/a <b>PSD:</b> n/a <b>PSD Avoidance:</b> NOx <b>NC Toxics:</b> n/a <b>112(r):</b> n/a <b>Other:</b>						
<b>Contact Data</b>			<b>Application Data</b>						
<b>Facility Contact</b>  Macrae Walters Sr. Environmental Specialist (704) 382-1513 526 South Church Street (EC12J) Charlotte, NC 28202	<b>Authorized Contact</b>  Adam Long Director, Gas Pipeline Operations (704) 731-4130 4720 Piedmont Row Drive Charlotte, NC 28210	<b>Technical Contact</b>  Macrae Walters Sr. Environmental Specialist (704) 382-1513 526 South Church Street (EC12J) Charlotte, NC 28202	<b>Application Number:</b> 1300155.19A <b>Date Received:</b> 03/12/2019 <b>Application Type:</b> Modification <b>Application Schedule:</b> TV-Significant <b>Existing Permit Data</b> <b>Existing Permit Number:</b> 09604/T07 <b>Existing Permit Issue Date:</b> 12/04/2015 <b>Existing Permit Expiration Date:</b> 11/30/2020						
<b>Total Actual emissions in TONS/YEAR:</b>									
CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP		
2017	0.1000	21.91	8.59	2.26	1.47	3.17	1.22 [Acetaldehyde]		
2016	0.1000	25.23	4.48	2.31	1.51	3.27	1.26 [Acetaldehyde]		
2015	0.0900	22.73	4.07	2.06	1.35	2.92	1.13 [Acetaldehyde]		
2014	0.0800	22.30	3.94	2.00	1.32	2.87	1.11 [Acetaldehyde]		
2013	0.0500	15.46	2.74	1.40	0.9200	1.95	0.7644 [Acetaldehyde]		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <b>Review Engineer:</b> Russell Braswell   <b>Review Engineer's Signature:</b>                      <b>Date:</b> </td> <td style="width: 50%; vertical-align: top;"> <b>Comments / Recommendations:</b>  <b>Issue</b> 09604/T08  <b>Permit Issue Date:</b> TBD  <b>Permit Expiration Date:</b> November 30, 2020 (no change)             </td> </tr> </table>								<b>Review Engineer:</b> Russell Braswell  <b>Review Engineer's Signature:</b> <b>Date:</b>	<b>Comments / Recommendations:</b> <b>Issue</b> 09604/T08 <b>Permit Issue Date:</b> TBD <b>Permit Expiration Date:</b> November 30, 2020 (no change)
<b>Review Engineer:</b> Russell Braswell  <b>Review Engineer's Signature:</b> <b>Date:</b>	<b>Comments / Recommendations:</b> <b>Issue</b> 09604/T08 <b>Permit Issue Date:</b> TBD <b>Permit Expiration Date:</b> November 30, 2020 (no change)								

## 1. Purpose of Application:

Piedmont Natural Gas - Concord Compressor Station ("PNG", "the facility") operates a natural gas compressor station in Cabarrus County under Title V Air Quality Permit 09604T07. PNG has submitted this application in order to remove an operating restriction incorporated in the permit under 15A NCAC 02Q .0317.

In the original application, PNG accidentally included Form A1-Minor, which indicates an application for minor modification. This application would not qualify for a minor modification under 15A NCAC 02Q .0515. PNG confirmed via phone call that this application was intended to be filed as a one-step significant modification under 02Q .0516.

## 2. Application Chronology:

- March 12, 2019 Application received in Raleigh Central Office.
- March 15 – 19, 2019 Correspondence between DAQ and PNG regarding the type of application and specifications of the emergency generator.
- March 21, 2019 An initial draft of the Title V permit and associated application review were sent to DAQ staff (Tom Anderson, Mark Cuilla, Samir Parekh, Bruce Ingle) and PNG staff (Macrae Walters). For a summary of comments received, see Attachment 3.
- Xxxx The EPA and Public Notice periods began.
- Xxxx The last notice period ended.
- Xxxx Permit issued

## 3. Discussion:

### a. Avoidance of Prevention of Significant Deterioration (PSD) and New Source Review (NSR)

The facility is permitted to operate seven compressors (ID Nos. COMP01 through 7) and one emergency generator (ID No. EG01). When the facility was initially constructed, only COMP01 through 3 and EG01 were included on the permit. According to the R02 application review<sup>1</sup>, the facility was required to limit the use of EG01 to less than 252 operating hours per year in order to limit potential emissions of NOx to less than 100 tons per year and thus avoid the requirements of PSD/NSR. The NOx emission limit and EG01 operating limit are incorporated into the Title V permit under 15A NCAC 02Q .0317 "Avoidance Conditions", specific condition 2.2 A.3.

PNG claims that, based on site-specific emission testing<sup>2</sup> and manufacturer specifications<sup>3</sup>, the operating limit on EG01 is not required to comply with the NOx emission limit:

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<sup>1</sup> R02 permit written by Charles Yirka, issued April 14, 2009.

<sup>2</sup> Emission testing for COMP01 through 3 was performed March 6, 2007. Test reference number 2007-017ST.

<sup>3</sup> See Attachment 1 for manufacturer's specifications.

$$\left(4,735 \frac{\text{horsepower[hp]}}{\text{compressor}}\right) (3 \text{ compressors}) \left(8,760 \frac{\text{hour[hr]}}{\text{year[yr]}}\right) \left(1.18 \text{ E-}03 \frac{\text{pound[lb]}}{\text{hp-hr}}\right) / \left(2,000 \frac{\text{lb}}{\text{ton}}\right) = 73.41 \frac{\text{ton}}{\text{yr}}$$

$$\left(770 \frac{\text{hp}}{\text{generator}}\right) (1 \text{ generator}) \left(500 \frac{\text{hr}^4}{\text{yr}}\right) \left(16.40 \frac{\text{grains[gr]}}{\text{hp-hr}}\right) / \left(7,000 \frac{\text{gr}}{\text{lb}}\right) \left(2,000 \frac{\text{lb}}{\text{ton}}\right) = 0.45 \frac{\text{ton}}{\text{yr}}$$

Because the combined potential emissions of NO<sub>x</sub> from COMP01 through 3 and EG01 are less than 100 tons per year, no operating limit should be required to demonstrate compliance with the NO<sub>x</sub> emission limit. Therefore, the following change will be made to the Title V permit:

*Paragraph 2.2 A.3.c:*

**Monitoring/Recordkeeping** [15A NCAC 2Q .0508(f)]

~~c. The emissions of NO<sub>x</sub> shall be limited by limiting the hours the emergency generator (ID No. EG01) is operated. The hours of operation shall be limited to 252 hours/year. If the hours of operation exceed the limit, the Permittee shall be deemed in noncompliance with 15A NCAC 2Q .0317.~~

c. No monitoring/recordkeeping is required to demonstrate compliance with NO<sub>x</sub> emissions from these sources (ID Nos. COMP01, COMP02, COMP03, and EG01).

b. Avoidance of Major Source Status

In addition to avoiding PSD/NSR, the facility is also avoiding major source status for emissions of hazardous air pollutants ("HAP"). The limit on HAP emissions is incorporated into the Title V permit under 15A NCAC 02Q .0317 "Avoidance Conditions", specific condition 2.2 A.5.

In order to avoid major source status, the facility must emit less than 10 tons of any individual HAP and less than 25 tons of total combined HAP per year. In order to demonstrate compliance, PNG must calculate HAP emissions from the facility every month and report them twice per year.

Based on the emission calculations in Table 5-2 below and the historical HAP emission rate shown on page 1 of this review, the increase in HAP emissions from this facility is not expected to exceed the major source threshold.

#### 4. Regulatory Overview:

The only regulation that is affected by this application is 15A NCAC 02Q .0317 (Avoidance of PSD/NSR and MACT). While PNG is subject to several other regulations, they are not affected by this application.

#### 5. Facility Emissions Review

Based on the updated information and 500 hr/yr operation, the new potential emissions from EG01 can be calculated. The results are shown in Table 5-1:

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<sup>4</sup> According to the EPA memo *Calculating Potential to Emit (PTE) for Emergency Generators*, issued September 6, 1995, 500 hours per year is appropriate for calculating PTE for emergency generators.

*Table 5-1: Updated emission calculations for EG01*

Pollutant	Emission Factor			Potential Emissions (ton/yr)
PM	9.91E-03	lb/MMBtu	*	1.36E-02
PM10	7.71E-05	lb/MMBtu	*	1.06E-04
SO2	5.88E-04	lb/MMBtu	*	8.08E-04
NOx	1.64E+01	gr/hp-hr	**	4.51E-01
VOC	2.96E-02	lb/MMBtu	*	4.07E-02
CO	1.52E+00	gr/hp-hr	**	4.18E-02
Formaldehyde	2.05E-02	lb/MMBtu	*	2.82E-02
Total HAP	3.24E-02	lb/MMBtu	***	4.46E-02

Constants and factors:	
maximum engine power:	770 hp
fuel consumption**:	7,140 Btu/hp-hr
potential operating time:	500 hr/yr
gains per pound:	7000 gr/lb

Notes:	
*	Factor taken from AP-42 Table 3.2-3
**	Factor taken from manufacturer's specifications (see Attachment 1)
***	Sum of pollutants noted as Hazardous Air Pollutants in AP-42 Table 3.2-3

The change in potential emissions from this facility can therefore be calculated. The potential emissions for 252 hours of operation were originally calculated in the R02 permit application review.

*Table 5-2: Change in facility-wide potential emissions*

Pollutant	Potential Emissions @252 hr/yr (ton/yr)	Potential emissions @500 hr/yr (ton/yr)	Difference (ton/yr)
PM	7.10E-03	1.36E-02	+0.01
PM10	5.50E-05	1.06E-04	+0.00
SO <sub>2</sub>	4.20E-04	8.08E-04	+0.00
NOx	4.01E+00	4.51E-01	-3.56
CO	2.80E-01	4.18E-02	-0.24
Formaldehyde	3.80E-02	2.82E-02	-0.01

Pollutant	Potential Emissions @ 252 hr/yr (ton/yr)	Potential emissions @ 500 hr/yr (ton/yr)	Difference (ton/yr)
Total HAP	3.80E-02 <sup>5</sup>	4.46E-02	+0.01

For a historical review of actual emissions from the facility, see the summary table on the first page of this review.

## 6. Other Regulatory Concerns

### a. Compliance/Inspection Status:

There have not been any noted compliance issues with this facility in the previous five years. The facility was most recently inspected by Bob Caudle on October 29, 2018.

### b. Application Requirements:

A P.E. seal was not included with the application because it was not required.

A zoning consistency determination was not included with the application because it was not required.

## 7. Public Notice/EPA and Affected State(s) Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0525, the EPA will have a concurrent 45-day review period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit pursuant shall be provided to EPA. Also, pursuant to 02Q .0522, a notice of the DRAFT Title V Permit shall be provided to each affected State at or before the time notice is provided to the public under 02Q .0521 above. South Carolina is an affected state, and Forsyth and Mecklenburg Counties are affected local programs.

## 8. Recommendations

Issue Permit 09604T08.

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<sup>5</sup> In the R02 application review, "total HAP" was not calculated for EG01. Instead, only formaldehyde was calculated.

Attachment 1 to Review of Application 1300155.19A  
Piedmont Natural Gas – Concord Compressor Station

Specifications for EG01



**Natural  
Gas  
Engines**



**GTA28**

**EMISSION DATA  
Sheet #ES5750C**

**Model:** GTA28  
**Type:** 4 Stroke, V-12  
**Aspiration:** Turbocharged & Aftercooled  
**Compression Ratio:** 10:1  
**Fuel:** Natural Gas

**Application:** Generator Drive  
**Rating:** 770HP at 1800RPM  
**Bore:** 5.5 in. (140mm)  
**Stroke:** 6.0 in. (152mm)  
**Displacement:** 1710 cu. in. (28L)

**Performance Data**

	<b>Standby</b>	<b>Prime</b>	<b>Continuous</b>
BHP @ 1800 RPM	770	700	595
Torque (ft-lbs)	2247	2042	1736
Fuel Flow (SCFH)	6075	5730	4825
Fuel Consumption (BTU/Hp-hr)	7140	7408	7339
Intake Air Flow (SCFM)	1799	1739	1678
Exhaust Mass Flow (lb/hr)	8245	7956	7647
Exhaust Flow (ACFM)	5277	5092	4894
Exhaust Temperature (°F)	1065	1089	1123

**Exhaust Emissions Data**

THC	Total Hydrocarbons (gr/hp-hr)	4.50	3.21	3.21
NMHC	Non-Methane Hydrocarbons (gr/hp-hr)	0.73	0.52	0.52
NEHC	Non-Ethane Hydrocarbons (gr/hp-hr)	0.37	0.26	0.26
NOx	Oxides of Nitrogen (gr/hp-hr)	16.40	17.22	18.60
CO	Carbon Monoxide (gr/hp-hr)	1.52	1.38	1.30
CO2	Carbon Dioxide (%)	7.50	8.00	8.10
O2	Oxygen (%)	4.60	3.50	3.20

**Test Conditions**

Data was recorded during steady-state rated engine RPM ( $\pm 25$ ) with full load ( $\pm 2\%$ ) and standardized to the following conditions:

**Fuel Specification:** Dry processed pipe line quality natural gas.  
**Fuel Temperature:** 60°F  $\pm$  9° at Flow Transmitter  
**Fuel Pressure:** 14.73 PSIA  $\pm$  0.5 PSIA at Flow Transmitter  
**Intake Air Temp:** 77°F  $\pm$  9° at inlet  
**Barometric Pressure:** 29.92 In. Hg  $\pm$  1 In. Hg

All emissions data is a calculated average of engines tested under the conditions shown above. This data is subject to instrumentation, measurement, and engine-to-engine variability. Engine operation with excessive air intake or exhaust restrictions beyond published maximum limits, or with improper maintenance may result in elevated emission levels.

*Specifications May Change Without Notice.*

Attachment 2 to Review of Application 1300155.19A  
Piedmont Natural Gas – Concord Compressor Station

**Table of Changes**

<b>Page*</b>	<b>Section*</b>	<b>Description</b>
Throughout	Throughout	<ul style="list-style-type: none"><li>• Updated permit/application numbers.</li><li>• Updated dates.</li></ul>
17	2.2 A.3.c.	<ul style="list-style-type: none"><li>• Removed operating and recordkeeping requirement in Paragraph 2.2 A.3.c.</li></ul>
24	3.	<ul style="list-style-type: none"><li>• Updated General Conditions to v5.3.</li></ul>

\* This refers to the current permit unless otherwise stated.

Attachment 3 to Review of Application 1300155.19A  
Piedmont Natural Gas – Concord Compressor Station

**Comments on Initial Draft**

- Mark Cuilla, by email on March 27, 2019

The email pointed out minor typos in the draft permit and review.

*Response: The indicated issues have been fixed.*

DRAFT